DOCUMENT RESUME

ED 410 899 HE 030 496

AUTHOR Lyons, Kevin J.; Young, Barbara E.; Haas, Patricia S.; Hojat, Mohammadreza; Bross, Theodore M.

TITLE A Study of Cognitive and Noncognitive Predictors of Academic Success in Nursing, Allied Health and Medical Students. AIR 1997 Annual Forum Paper.

PUB DATE 1997-05-00

NOTE 25p.; Paper presented at the Annual Forum of the Association for Institutional Research (37th, Orlando, FL, May 18-21, 1997).

PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.

DESCRIPTORS *Academic Achievement; Academic Aptitude; *Allied Health Occupations Education; Analysis of Covariance; Correlation; *Females; Grade Point Average; Grade Prediction; Higher Education; Institutional Research; *Medical Students; Multiple Regression Analysis; *Nursing Education; Predictive Measurement; *Predictor Variables; Questionnaires; Statistical Analysis; Student Characteristics; Surveys

IDENTIFIERS *AIR Forum; Thomas Jefferson University PA

ABSTRACT

This study, a collaborative undertaking between the college of health professions and the medical college at Thomas Jefferson University (Pennsylvania), was part of a larger project intended to examine whether a selected set of academic, demographic, and psychosocial variables are predictive of nursing and allied health student academic performance. The study compared psychosocial profiles of 71 female medical students with 182 female students in nursing and allied health fields. The survey instrument measured: loneliness, test anxiety, general anxiety, self-esteem, extroversion, external locus of control, neuroticism, stressful life events, and depression. Results indicated that medical, nursing, and allied health students differed considerably on a number of measures. Female allied health and nursing students appeared to be more depressed than female medical students, while female medical students had greater perceptions of general health and closer relationships with their fathers. The study also found a significant relationship in the expected direction between grade point average and stressful life events, test anxiety, perception of health, and self esteem. An unexpected finding was that the correlation between transfer grade point average and first semester grade point average was not significant. Six data tables are included. (Contains 21 references.) (CH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 410 899

A STUDY OF COGNITIVE AND NONCOGNITIVE PREDICTORS OF ACADEMIC SUCCESS IN NURSING, ALLIED HEALTH AND MEDICAL STUDENTS

Kevin J. Lyons, Ph.D.
Associate Dean and Director
Center for Collaborative Research/
Principal Investigator, Longitudinal Study
College of Health Professions
Thomas Jefferson University
130 South 9th Street, Suite 2200
Philadelphia, Pennsylvania 19107
(215) 503-8188

Patricia S. Haas, M.B.A.
Educational Coordinator
College of Health Professions
Thomas Jefferson University
130 South 9th Street, Suite 715
Philadelphia, Pennsylvania 19107
(215) 503-8627

Barbara E. Young, M.P.H.
Educational Coordinator
College of Health Professions
Thomas Jefferson University
130 South 9th Street, Suite 1520
Philadelphia, Pennsylvania 19107
(215) 503-5305

Mohammadreza Hojat, Ph.D.
Director, Jefferson Longitudinal Study/
Research Associate Professor,
Psychiatry and Human Behavior
Center for Research in Medical Education
and Health Care
Jefferson Medical College
Thomas Jefferson University
1025 Walnut Street, Suite 123
Philadelphia, Pennsylvania
(215) 955-8907

Theodore M. Bross, Ed.D.
Manager, Academic Systems
Department of Information Systems
Thomas Jefferson University
130 South 9th Street, Suite 300
Philadelphia, Pennsylvania
(215) 503-8773

BEST COPY AVAILABLE

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

AIR

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

1

1AE030 496

for Management Research, Policy Analysis, and Planning

This paper was presented at the Thirty-Seventh Annual Forum of the Association for Institutional Research held in Orlando, Florida, May 18-21, 1997. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Jean Endo
Editor
AIR Forum Publications

ABSTRACT

Much of the research on predictors of academic success has focused on cognitive variables. There is some recent evidence that psychosocial variables might improve the ability of cognitive variables to predict academic success. This project is a collaborative study between a college of health professions and a medical college. One hundred eighty-two nursing and allied health students and 71 female medical students completed a survey instrument which assesses 12 psychosocial characteristics. Demographic and academic data were also collected for the nursing and allied health students. A comparison was made of the profiles of the medical students with the nursing and allied health students. Significant differences were found between the two groups. Bivariate correlations were also computed between psychosocial variables and first semester GPA for the nursing and allied health students. Stepwise regression was computed with first semester GPA as a criterion variable and transfer GPA and psychosocial characteristics as predictors. Psychosocial characteristics were found to be better predictors than transfer GPA, although the amount of variance explained was extremely low.

A STUDY OF COGNITIVE AND NONCOGNITIVE PREDICTORS OF ACADEMIC SUCCESS IN NURSING, ALLIED HEALTH AND MEDICAL STUDENTS

INTRODUCTION

The recruitment and admission of students who are likely to be successful in academic programs has been an ongoing concern for educators, particularly those in the health professions. While there have been numerous studies that attempt to predict success of medical students (Hojat, Robeson, Damjanov, Veloski, Glaser, & Gonnella, 1993; Rosenfeld, Hojat, Veloski, Blacklow, & Goepp, 1992) and nursing students (Jenks, Selekman, Bross & Paquet, 1989; Lyons, Field, Hyslop & Hoertz, 1993), there have been very few which focus on the allied health professions. Allied health professionals represent approximately 60% of the health care workforce in the United States despite a current shortage of professionals in almost all of the disciplines. It is expected that the demand and need for these professionals will continue to grow in view of the changes occurring in health care delivery. Allied health professionals' major areas of responsibility have been the delivery of health or related services pertaining to the identification, evaluation and prevention of disease and disorders; dietary and nutrition services; rehabilitation and health system management (Lyons & Abrams, 1995). With increases in life expectancy and efforts to reduce hospital length of stay, the need for rehabilitation and home health care services will continue to rise. The current focus on primary care and emphasis on health promotion and disease prevention also highlights the importance of allied health professionals in the delivery of health care (Lyons et al., 1995).

Despite the projected increase in demand for allied health professionals, there has been a slowing of growth in many of these professions. A number of reasons have been cited for this

problem including a recent decrease in the number of accredited programs in some professions, smaller size of graduating classes, increased difficulty in recruiting qualified students, shortage of qualified faculty and a shortage of clinical affiliation placement sites necessary for student clinical training. In addition, the cost of allied health education for both students and institutions, especially for programs that require training in the use of advanced technology, is high. One cost estimate, in 1993 dollars, to educate these professionals ranges from $13,500/year for an occupational therapist to over $19,000 for a laboratory scientist (Lyons et al., 1995).

Allied health educators need to ensure that students who graduate from their programs are academically and clinically competent, and able to pass their licensing examinations. Given the difficulties related to recruiting students and limited institutional resources, it is imperative that decisions for admission are based on criteria that can identify those students who have the ability to be successful. It is also important to identify characteristics of potential students who, while academically capable, might have difficulties in other areas which would hinder their chances of success.

Numerous studies have attempted to find adequate predictors of academic and clinical performance. Researchers have identified cognitive variables, such as prior GPA or standardized admissions tests, demographic characteristics, student learning styles, personality variables and other psychosocial variables as potential predictors of academic achievement or clinical competence. Others have tried various combinations of these variables with some success at finding meaningful explanations of academic performance.

While cognitive factors have shown some promise in predicting future performance, they often result in explaining a relatively small percentage of the variance. Campbell & Dickson (1996) conducted

a 10 year review of nursing studies which investigated correlates of retention, graduation, and success on the National Council Licensing Examination (NCLEX). They found, generally, that grades in nursing and science courses were the most effective cognitive predictors of success, while age and parental education were the most effective demographic predictors. When these studies were assessed for the effects of noncognitive variables, only test anxiety and self-concept/esteem showed any correlation with success in passing the nursing licensure examination. For example, Heupel (1994) conducted a study of selected academic variables to predict success in passing the NCLEX. She found that the strongest combination of variables that were predictive of success were grades in a sophomore nursing theory course, the junior year grade point average and a senior nursing theory course. Jenks et al., (1989) also found that specific nursing course grades were better predictors of performance on the NCLEX than were transfer grade point average and science grade point average. The best predictor of success, however, was the Mosby ASSESSTEST. McClelland, Yang & Glick (1992) also studied predictors of success on the NCLEX. They used admission selection variables, achievement in nursing programs and performance on a standardized nursing achievement test. They found that the best predictors were students' pre-nursing grade point average and American College Testing scores.

Abdur-Rahman, Femea & Gaines (1994) found that the Nurse Entrance Test (NET) was an accurate predictor of success in the first semester of nursing school, particularly the math and composite scores. They found that test-taking skills, social stressors and learning styles were also predictive, but to a lesser degree. Lyons et al., (1993), conducted a retrospective study of over 1800 nursing and allied health graduates of one college between 1987 and 1993. Five variables were entered into a stepwise regression equation to predict final GPA. These variables were transfer GPA, transfer science GPA, minority and marital status, and age. However, these

variables were only able to explain approximately 25% of the variance. When separate analyses were conducted for each program, the two variables which were most predictive of final GPA were either transfer science GPA or transfer GPA. The amount of variance accounted for varied considerably among departments, ranging from a high of 67% in dental hygiene to a low of 14% in nursing.

Other studies have assessed noncognitive variables in predicting success. For example, Scott & Markert (1994) examined critical thinking skills, as measured by the Watson-Glaser Critical Thinking Appraisal, and found them to be moderately predictive of academic success during preclinical medical education. Nortridge, Mayeux, Anderson & Bell (1992) used the Modified Hill Cognitive Style Model, which measures how subjects prefer to learn, to predict success in first semester diploma nursing students. They found that a preference for finding meaning from written words, independent problem-solving and a logical deductive approach in decision-making were positively correlated with grades. Kornguth, Frisch Shovein & Williams (1994) used a 37-question noncognitive questionnaire (NCQ) to predict academic success in a baccalaureate nursing program. Eight factors were tested: positive self-concept, realistic self-appraisal, understanding and dealing with racism, preference for long-range over short-range goals, availability of strong supporting people, successful leadership experience, demonstrated community service and knowledge acquired in a field. Only two variables correlated with GPA: understanding of racism and realistic self-appraisal. The researchers also suggested that male nursing students are more likely to need support in their academic programs, and minority students may need support to establish community ties.

Blagg (1985) investigated the relationship between three cognitive style measures, integrative complexity, dogmatism, and field-independence-dependence; learning style preferences as measured by

Canfield's Learning Styles Inventory and academic success. Data on cognitive-style and learning-style was collected from 51 masters' students in an allied health education program who then took a comprehensive master's examination that contained multiple choice and essay questions. While no significant relationship between academic success and the cognitive-style variables was found, learning style variables accounted for between 20.44% and 41.36% of the variance on multiple-choice and essay portions of the comprehensive examination, respectively.

Rosenblum, Wetzel, Platt, Denaies, Crawford, & Rosenthal (1994) studied the non-verbal behavior of medical students by viewing videotapes of student-patient interactions. Three behavioral characteristics: greater smiling, less shyness, and less avoidance/self-touching were the best predictors of clinical grades.

Similar approaches have been reported in fields other than health care. For example, Rothstein, Paunonen, Rush & King (1994) investigated five personality factors, considered as a comprehensive taxonomy of personality traits to predict the academic performance of MBA students. These traits are: Extroversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. While none of these variables was found to be associated with performance at written work, class participation was predicted by three of the five factors: Extroversion, Agreeableness and Openness to Experience. Young et al. (1992) investigated the academic success of black student athletes, using the Noncognitive Questionnaire (NCQ) in conjunction with prior academic experience such as high school grades. They found that grades can best be predicted by long term goals, high school grades and community service.

There is some evidence that when noncognitive, or psychosocial, variables have been examined in conjunction with cognitive variables, predictive power is increased. Hojat et al. (1993) studied 175 second-year medical students using standard admissions criteria to predict basic science grades, clinical

science grades and rating of clinical competence. In addition, they administered nine psychosocial tests measuring: general anxiety, test anxiety, depression, external locus of control, loneliness, neuroticism, self-esteem, sociability, and stressful life events. The researchers found that psychosocial measures increased explained variance in basic science grades from 15% to 32% and from 12% to 27% in the clinical science grades. Finally, the psychosocial measures were found to be better predictors of clinical ratings, explaining 14% of the variance compared to 4% for the admissions measures.

This study is the first step in a larger investigation to determine the ability of a comprehensive set of academic, demographic and psychosocial variables, to predict academic performance of nursing and allied health students. The study will combine the models developed by Hojat et al., and Lyons et al., to determine their applicability to prospective nurses and allied health students. The study will also compare the profile of medical students with students in nursing and allied health on psychosocial variables to investigate differences in the types of students entering the various fields.

METHODS

Psychosocial Questionnaire

The psychosocial questionnaire used in this study was developed by the Center for Medical Education and Research at Jefferson Medical College. The instrument is a short form psychological instrument adapted from well-established personality instruments and designed to measure the following attributes: Loneliness, Test Anxiety, General Anxiety, Self-Esteem, Extroversion, External Locus of Control, Neuroticism, Stressful Life Events and Depression. In addition, the instrument contained scales which measure student perception of their early relationship with their parents and another which measures the duration (chronicity) of loneliness

The description of the development of the questionnaire and psychometric properties and of this instrument, have been established and are reported elsewhere (Hojat, Erdmann, Robeson, Damjanov & Glaser, 1994). Reliability was established through tests of internal consistency; construct validity through factor analysis; and concurrent validity through comparison with relevant external criterion measures.

Subjects

Demographic information and data on prior educational achievement were extracted from the College of Health Professions' Admissions and Registrar data base for all students entering the College in the fall of 1996. The abbreviated battery of psychological tests used in the Hojat et al., study were distributed to first year students in three courses: an interdisciplinary course attended by students in the occupational therapy, physical therapy and diagnostic imaging programs and two first semester courses for nursing and laboratory sciences students. The purpose of the study was explained to each group of students. They were assured that participation was entirely voluntary, that their responses would be kept confidential and results would only be reported in the aggregate. A total of 182 usable completed questionnaires were returned. The 210 medical students in the entering class of 1996 were also given the abbreviated battery of psychological tests. Since there were not a sufficient number of men in the College of Health Professions to make meaningful comparisons with male medical students, it was decided to only compare the psychosocial profiles of women in both Colleges. Therefore, the responses of the 71 women in the medical school class were separated for comparison to the College of Health Professions' students.

ANALYSIS

In Table 1 a description of the sample of nursing and allied health students is presented, organized by sex and program.

Table 1

Student Demographic Characteristics

Program	Males	Females	Total
Nursing	6	48	54
Occupational Therapy	4	44	48
Physical Therapy	3	3	6
Diagnostic Imaging	3	18	21
Laboratory Sciences	11	35	46
Not identified			7
Totals	**27**	**141**	**182**

It should be noted that completed surveys were received from only six physical therapy students. Due to midterm examinations, many of the physical therapy students did not attend the class in which the survey was administered. No attempt was made to survey these students a second time. The results from these students were included in the aggregate data analysis, but no discipline-specific analyses was conducted.

The mean, standard deviation and effect size estimates for female medical students (n=71) and female students in the College of Health Professions (n=141) for each of the psychosocial measures are presented in Table 2.

Table 2

Means and Standard Deviations of Psychosocial Measures for Female Students in Medicine and Health Professions Entering Class 1996

PSYCHOSOCIAL MEASURES	Medical (n = 71) M	Medical (n = 71) SD	Health Professions (n = 141) M	Health Professions (n = 141) SD	Effect Size Estimate
Intensity of Loneliness	9.4	2.4	10.5	3.2	-.37
General anxiety	12.8	2.9	14.3	3.6	-.43
Depression	1.3	2.0	3.1	3.5	-.56
Perception of general health	3.6	.51	3.1	.70	.73
Perception of father	9.4	1.7	8.4	2.6	.42

Multivariate statistic (Wilks' Lambda) = .78
related multivariate $F(12,89) = 4.41$, $p < .01$
all reported effect size significant at $p > .05$

Multivariate analysis of variance (MANOVA) was employed, followed by univariate analyses of variance and Duncan test for pairwise comparisons. Effect size estimates were also calculated for each psychosocial measure. Determination of statistical significance of differences related to different scales does not give useful information about the degree to which the phenomenon under investigation exists (Cohen, 1987). The effect size estimates provide useful information about the degree to which the differences are important on a scale-free index. The

practical significance of the differences can be judged based on Cohen's suggestions (Cohen, 1987). Any effect size estimate around .20, according to Cohen, is considered trivial, estimates around .50 are moderate, and those around .75 and larger are considered important.

Results of statistical analyses indicated that the differences between medical and health professions female students were significant in a global multivariate model (Wilks' Lambda = .78, related multivariate F (12, 187) = 4.41, P<.01).

The Duncan test showed that students in the College of Health Professions scored significantly higher than their counterparts in medical school on intensity of loneliness, general anxiety, and depression scales, but scored lower than medical students on their perception of their general health, and perception of relationships with their fathers. Examinations of the effect size estimates reported in the table suggest that none of these differences is trivial.

Bivariate correlations between first semester GPA obtained in the College of Health Professions, and transfer GPA and the psychosocial measures are reported in Table 3. Only variables that were significantly correlated with the criterion measure are reported in this table.

Table 3

Bivariate Correlations

Grade Point Average and Psychosocial Predictors

Total College

N = 165

GPA and:

	r	p<
Stressful life events	- .31	.0001
Test anxiety	- .29	.0001
Perception of general health	.26	.001
Self-esteem	.21	.007
Relationship with mother	.18	.02
Extroversion	.15	.05
Transfer GPA	.14	ns

As shown, despite statistical significance, the magnitudes of correlations are not impressive. It is interesting to note that the first semester GPAs have higher correlations with five of the psychosocial measures than with transfer GPA.

A separate analysis was conducted for each of the programs in the College. Table 4 presents the significant bivariate correlations between transfer GPA, the pyschosocial variables and first semester GPA. As can be seen from this table, significant relationships were found in only three of the departments. In diagnostic imaging the only significant relationship was with Transfer GPA. Two psychosocial variables were common in the other two departments; Loneliness and Stressful Life Events with the latter the only one in common with entire College results.

Table 4

Bivariate Correlations Between Grade Point Average and Selected Psychosocial Variables by Department

Department	n	Psychosocial Variable	Correlation	p<
Occupational Therapy	31	Stressful life events	-.39	.03
		Loneliness	-.38	.03
Diagnostic Imaging	16	Transfer GPA	.50	.05
Laboratory Sciences	21	Loneliness	-.63	.002
		Locus of control	-.56	.007
		Self-esteem	.52	.01
		Stressful life events	-.47	.03
		Neuroticism	-.45	.04
		Test anxiety	-.43	.05

A stepwise multiple regression analysis was conducted for the entire sample of College of Health Professions students. Because previous research conducted on students in the College found that transfer GPA had low, but significant, predictive value, a decision was made to force Transfer GPA into the equation, even though the bivariate correlations were generally non-significant. The results of that analyses are presented in Table 5.

Table 5

Stepwise Regression

Entering Class of 1996

All Programs

Variable	Partial R^2	Model R^2
Transfer GPA	.031	.031
Stressful life events	.047	.079
Self-esteem	.024	.102
Extroversion	.030	.132
Perception of health	.015	.147
General anxiety	.015	.162
Test anxiety	.021	.183

As can be seen from the Table, all of the variables entered into the equation were extremely low and, in combination, only predicted 18% of the variance. Separate regression analyses were then conducted for each of the academic departments with the exception of physical therapy. The results of this analysis are presented in Table 6.

Table 6

Stepwise Regression Analysis for Predicting GPA by Department

Department	n	Variables Entered	Partial R^2	Model R^2
Nursing	44	Transfer GPA	.061	.061
		Self esteem	.076	.137
		Relationship with mother	.042	.179
Diagnostic Imaging	14	Transfer GPA	.064	.064
		Relationship with mother	.175	.241
Laboratory Sciences	15	Transfer GPA	-.054	.054
		Stressful life events	.295	.349

Again, significant relationships were found in only three of the four departments. However, as in the College sample, the magnitude of the predictive power of the variables was relatively low. While the psychosocial variables added to the predictability of College GPA, only in the Department of Laboratory Sciences was the R^2 meaningful.

DISCUSSION

This study is the first step in a larger study. Its purpose was to begin the investigation of predictors of academic success in nursing and allied health. A second purpose was to examine similarities and differences in the psychosocial characteristics of medical, nursing and allied health students. Because of the preliminary nature of the study, no definitive conclusions can be drawn from the data at this time. However, the findings raise a number of questions and suggest areas that need further investigation and explanation.

The first analysis was designed to compare the psychosocial characteristics of College of Heath Professions students and medical students. The results indicate that medical, nursing and allied health students differed considerably on a number of psychosocial measures. There were significant differences on five of the nine measures: Intensity of Loneliness, General Anxiety, Depression, Perception of General Health and the Perception of Father. Female allied health students appear to be more depressed, anxious and lonely, while female medical students had a greater perception of their general health and a closer relationship with their fathers. Of these, the higher level of depression of allied health students is considered to be a moderate effect size, while the better perception of general health of the medical students represents a large and important effect size.

The finding of a higher level of anxiety, depression and loneliness among nursing and allied health students is disturbing. The literature provides no clear explanation for why there should be differences between the two groups. One possible explanation for some of the differences could be related to the timing of the survey administration. Because of scheduling conflicts, the psychosocial questionnaire was given to two of the classes a week before midterm examinations. The experience of adjusting to a new school and preparing for their first major set of examinations could cause students to be more anxious than usual. Further investigation needs to be conducted with additional groups of students. Should this pattern continue, it has clear implications for directors of student affairs, faculty and others on campus who work with students. In addition, since only differences between students in the two Colleges were analyzed in this study, more analysis needs to be done regarding the magnitude of the scores in each group.

The finding of a non-significant correlation between transfer grade point average and first semester grade point average was not expected. In much of the research literature, and in past studies of College of Health Professions students, this relationship, while low, was significant. Prior academic success is usually a good predictor of future academic accomplishment. Two explanations might account for this poor correlation. The first is that first semester grade point average may not reflect students true ability. Students are adjusting to a new environment and often take courses not related to the major field. Once students adjust to college life, grade point average might prove to be a better predictor. The second explanation is that no adjustment was made in this initial analysis for the different colleges and universities from which students transferred. Grade point average at a community or junior college may not reflect the same ability

as a high average at a major university. Future research needs to examine both of these possibilities.

The significant relationship between grade point average and stressful life events, test anxiety, perception of health and self-esteem is more expected. Test anxiety and self-esteem, were two of the variables identified as predictors by Campbell et al. (1996) in her study of nurses. It would be expected that a student under stress, either from certain life situations or from worry about upcoming examinations, to fare less well than those students not under stress. In addition, those students with high self-esteem or those having a better perception of their own health, particularly in an academic institution that values health promotion, would also be expected to perform better.

FUTURE RESEARCH RECOMMENDATIONS

This exploratory study has suggested the need to continue the current analysis and conduct a number of follow up studies. There are at least four studies that will be carried out.

1. Continue gathering psychosocial data on future classes of students to increase the size of the sample and increase the stability of the measures.

One problem with the analyses conducted in this study was that the more the sample was divided into meaningful comparison groups, the smaller the groups became. While nursing, the largest of the departments, had a group size of 44, some analyses of laboratory sciences resulted in a sample size of 15. Once additional cohorts of students are included in the data base, group size will allow for a more meaningful analyses. A larger sample will also make it possible to group students according to feeder schools to determine whether transfer GPA from some schools is a better predictor than from others.

2. Refine the measure of transfer GPA

Students enter the College of Health Professions from a variety of academic backgrounds. All students must have a minimum of two years of undergraduate education. However, some may have attended a community college, others may have attended a private college. Recently, some academic departments have established programs designed for those with a baccalaureate degree. If transfer GPA is to be used as a predictor, allowances for the different feeder schools will need to be incorporated into the analyses.

3. Add transfer science GPA and selected demographic variables in the analysis

There is some evidence that transfer science GPA is a better predictor of academic success in nursing and allied health programs than overall transfer GPA. Therefore, in future studies, this variable will be added to the analysis. Prior research in the College of Health Professions has also demonstrated that for certain programs, demographic variables provide a reasonable prediction of final GPA. These included age, sex, marital, minority and enrollment status. These variables, along with the various transfer grade point averages and the psychosocial variables, need to be investigated as a group to determine the extent to which they can predict academic success.

4. Analyze predictors of clinical competence of nursing and allied health professionals

While studies of the ability of certain variables to predict academic achievement may provide valuable information to academic institutions interested in admitting the most academically qualified students, a more important study is one that would investigate predictors of successful practice after graduation. Little or no research has been conducted in allied health which attempts to identify these predictors, primarily because of the difficulty in identifying quantitative measures of performance. Studies in medicine have often used clinical clerkship

experiences as criterion measures of competence. Since allied health students do not have these experiences, there is little or no opportunity to assess practice using a standardized measure of performance. A model of performance needs to be developed which can be used to assess student accomplishment in practice and then determine the ability of cognitive and pyschosocial measures to predict success.

These four studies are designed to improve the accuracy of the variables under investigation and develop a data base large enough to conduct meaningful analyses. Once these questions have been completed, it will be possible to determine whether a search for meaningful predictors of academic and clinical success is likely to be successful, or whether the nature of students entering nursing and allied health is so varied as to make further investigation impractical.

REFERENCES

1. Abdur-Rahman, V., Fernea, P. L., & Gaines, C. (1994, Winter). The nurse entrance test (NET): An early predictor of academic success. The ABNF Journal, 10-14.
2. Aspinwall, L. G., & Taylor, S. E. (1993). Effects of social comparison direction, threat, and self-esteem on affect, self-evaluation, and expected success. Journal of Personality and Social Psychology, 64(5), 708-722.
3. Blagg, J. D. Jr. (1995, February). Cognitive styles and learning styles as predictors of academic success in a graduate allied health education program. Journal of Allied Health, 89-98.
4. Campbell, A. R., & Dickson, C. J. (1996). Predicting student success: A 10-year review using integrative review and meta-analysis. Journal of Professional Nursing, 12,(1), 47-59.
5. Hojat, M., Robeson, M., Damjanov, I., Veloski, J., Glaser, K., & Gonnella, J. (1993). Students' psychosocial characteristics as predictors of academic performance in medical school. Academic Medicine, 68(8), 635-637.
6. Hojat M., Erdmann, J., Robeson, M., Demjanov, I., & Glaser, K., (1994). A study of pyschometric characteristics of abridged versions of selected psychological measures given to medical school students for the purpose of predicting their clinical competence. Interdisciplinaria, 11, 129-48.
7. Huepel, C. (1994). A model for intervention and predicting success on the national council licensure examination for registered nurses. Journal of Professional Nursing, 10(1), 57-60.
8. Jenks, J., Selekman, J., Bross, T., & Paquet, M. (1989, March). Success in NCLEX-RN: Identifying predictors and optimal timing for intervention. Journal of Nursing Education, 28(3), 112-118.

9. Koenig, J. A. (1992, March). Comparison of medical school performances and career plans of students with broad and with science-focused premedical preparation. Academic Medicine, 76(3), 191-196.

10. Kornguth, M., Frisch, N., Shovein, J., & Williams, R. (1994). Noncognitive factors that put students at academic risk in nursing programs. Nurse Educator, 19(5), 24-27.

11. Lyons, K. J., Grifone Field, T., Hyslop, T., & Hoertz, K. (1993). Assessing predictors of academic success: A longitudinal study of nursing and allied health students, Association of Schools of Allied Health Professions' 26th Annual Conference, Galveston, TX.

12. Lyons, K. J., & Abrams, L. (1995). Role of allied health in health care. Medicine and Health Care in the 21st Century, Pennsylvania Academy of Sciences.

13. MacLeod, S. M., & McCullough, H. N. (1994). Social science education as a component of medical training. Social Science Medicine, 39(9), 1367-1373.

14. McClelland, E., Yang, J. C., & Glick, O. (1992) A statewide study of academic variables affecting performance of baccalaureate nursing graduates on licensure examination. Journal of Professional Nursing, 8(6), 342-350.

15. Madison, D. L. (1994., October). Medical school admission and generalist physicians: A study of the class of 1985. Academic Medicine, 69(10), 825-831.

16. Rosenblum, N., Wetzel, M., Platt, O., Daniels, S., Crawford, J., & Rosenthal, R. (1994, February). Predicting medical student success in a clinical clerkship by rating students' nonverbal behavior. Archives Of Pediatric Adolescent Medicine, 148, 213-219.

17. Rosenfeld, L. M., Hojat, M., Veloski, J J., Blacklow, R. S., & Goepp, C. E. (1992). Delays in completing medical school: Predictors and outcomes. Teaching and Learning in Medicine, 4, 162-7.

18. Rothstein, M. G., Paunonen, S. V., Rush, K. C., & King, G. A. (1994). Personality and cognitive ability predictors of performance in graduate business school. Journal of Educational Psychology, 86(4), 516-530.

19. Scott, J. N., & Markert, R. J. (1994). Relationship between critical thinking skills and success in preclinical courses. Academic Medicine, 69(11), 920-924.

20. Young, B. D., & Sowa, C. J. (1992, July). Predictors of academic success for black student athletes. Journal of College Student Development, 33, 318-324.

21. Nortridge, J., Mayeux, V., Anderson, S., & Bell, M. (1992). The use of cognitive style mapping as a predictor for academic success of first-semester diploma nursing students. Journal of Nursing Education, 31(8), 352-356.